ACCELERATED LEARNING PROGRAMME (ALP)
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11th CLASS CHEMISTRY GUESS PAPERS

CHAPTER NO. 1 BASIC CONCEPTS

SHORT QUESTIONS:

1. Calculate gram atom in 0.1 gm of Sodium (ay mass of sodium = 23)?
2. Difference between actual yield and theoretical yield.
3. Give the reason to explain that actual yield is less than the theoretical yield.
4. Define Stoichiometry and give two assumptions for stoichiometric calculations.
5. 23 g of sodium and 238 g of uranium have equal number of atoms in them.
6. Mg atom is twice heavier than that of carbon atom.
7. 180 g of glucose and 342 g of sucrose have the same number of molecules but different number of atom present in them.
8. 4.9 of H_2SO_4 when completely ionized in water, have equal number of positive and negative charge but the number of positively charged ions are twice the number of negatively charged ion.
9. One mg of K_2CrO_4 has thrice the number of ions than the number of formula units when ionized in water. Justify.
10. Two grams of H_2, 16 g of CH_4 and 44 g of CO_2 occupy separately the volumes of 22.414 dm3 although the sizes and masses of molecules of three gases are very different from each other.

LONG QUESTIONS:

1. A well-known ideal gas is enclosed in a container having volume 500 cm^3 at S.T.P. Its mass comes out to be 0.72 g. What is the molar mass of this gas?
2. Mg reacts with HCl to give hydrogen gas. What is the minimum volume of HCl solution (27 % by weight) required to produce 12.1 gm of H_2? The density of HCl solution is 1.14 g/cm^3.
3. $Mg + 2HCl \longrightarrow MgCl_2 + H_2$
4. NH4 can be produced by heating together two solid NH4Cl and $Ca(OH)_2$. If a mixture containing 100 g of each solid is heated then how many grams of NH_3 is produced? Atomic mass of Ca = 40
   $2NH_4Cl + Ca(OH)_2 \longrightarrow CaCl_2 + 2NH_3 + 2H_2O$

5. When limestone ($CaCO_3$) is roasted, quick lime (CaO) is produced according to the following equation, the actual yield of Cao is 2.5 kg, and When 4.5 kg of lime stone is roasted. What is percentage yield of this reaction (Ca = 40, C = 12, O = 16)
   $CaCO_3 \longrightarrow CaO + CO_2$

CHAPTER NO. 2 EXPERIMENTAL TECHNIQUES IN CHEMISTRY.

SHORT QUESTIONS:

1. Give the main characteristics of the solvent used for crystallization
2. Define sublimation with two examples
3. Define Rr value and why it has no unit.
4. State the distribution law.
5. Describe Ether extraction.
6. Difference between Adsorption chromatography and Partition chromatography
7. Write down the uses of chromatography

LONG QUESTIONS:

NO LONG QUESTIONS IN THIS CHAPTER.

CHAPTER NO. 3 GASES

SHORT QUESTIONS:

1. Derive Boyle's law from Kinetic molecular theory of gases.
2. Define Quantitative definition of Charles's law.
3. Regular air cannot be used in diver's tank. Give reasons.
4. Write two uses of plasma.
5. Justify that SO_2 is comparatively non –ideal at 273 K but behaves ideally at 327 ^oC.
6. Derive the units of "R" in general gas equation when the pressure is in atmospheres and volume in dm3
7. Derive molecular mass of a gas by general gas equation.

LONG QUESTIONS:

1. What is Dalton's law of partial pressure? Also discuss its application.
2. One mole of methane is maintained at 300 K . Its volume is 250 cm^3. Calculate the pressure exerted by the gas when it considered as an ideal gas?
3. Calculate the mass of 1 dm^3 of NH_3 gas at 30 ^oC and 100 mm/Hg pressure, considering the NH_3 is behaving ideally?

4. Give eight postulates of kinetic molecular theory.

CHAPTER NO. 4 LIQUIDS AND SOLIDS

SHORT QUESITONS:

1. Define dipole-dipole force with example
2. Why HF is weaker acid than HCl?
3. Ice floats of H_2O. Give reason?
4. Water is liquid at room temperature while H_2S is a gas. Comment?
5. Describe the importance of vacuum distillation?
6. Describe cleaning action of soaps and detergents.
7. Why boiling point of water varies from sea-level to higher places.
8. Define Transition temperature and give two example.
9. Why water is liquid at room temperature but H_2S and H_2Se are gases, comment.
10. Define liquid crystal with one example.
11. What are pseudo-solids?
12. What is isomorphism? Give an example.
13. Define Isomorphism and Polymorphism.
14. Define Transition temperature.
15. What are unit cell dimensions?

LONG QUESITONS:

1. What is H-bonding? Discuss H-bonding in biological compounds.
2. How does the hydrogen bonding explain the formation of ice lesser density than liquid water.
3. Define liquid crystals. Discuss important uses of liquid crystal.
4. Write down the properties of ionic solids.

CHAPTER NO. 5 ATOMIC STRUCTURE.

SHORT QUESITONS:

1. The e/m values of positive rays obtained from hydrogen gas is 1836 times less than that of cathode rays. Justify.
2. Write four properties of positive rays.
3. Explain Rutherford's Model of atom.
4. Describe Millikan's oil drop method for determination charge of electron.
5. What is J.J.Thomson's experiment for determining e/m value of electron? Evaluate mass of electron from this experiment.
6. Derive the formula for calculating the energy of an electron in nth orbit using Bohr's model.

7. Give defects of Bohr's atomic model?
8. What is Atomic spectrum? Explain its types.
9. Discuss principal and Azimuthal Quantum number.
10. Why e/m of cathode rays is equal to that of electrons?
11. What is Planck's quantum theory?
12. Describe Pauli's exclusion principle. Give one example.

LONG QUESTIONS:

1. Explain Rutherford's model of atom. Give its defects.
2. Define Quantum numbers. Discuss briefly Azimuthal Quantum number.
3. Give the different postulates of Bohr's atomic model.

CHAPTER NO. 6 CHEMICAL BONDING

SHORT QUESTIONS:

1. Define ionic and covalent radii.
2. Briefly explain atomic and ionic radii with example.
3. Ionization Energy decreases down the group, although nuclear charge increase. Explain.
4. Ionization energy is index to the metallic character. Why?
5. No bond is chemistry is 100% ionic. Justify it.
6. What is pi –bond? Give an example.
7. What is meant by Bond order? Calculate bond order for H_2- molecule.
8. Why sigma bond is stronger than pi bond.
9. Why cationic radius is smaller than parent atom?
10. Explain the structure of NH_3 molecule on the basis of VSEPR theory.
11. Why the lone pair electrons repel strongly than the bond pair of electrons?
12. Write two points of valence bond theory.
13. Why the bond distance in the compromise distance between two atoms.
14. Why the bond angle in H_2O and NH_3 are different, although O and N atom are sp^3 hybridized.

LONG QUESTIONS:

1. Write down the main postulates of valence shell electron pair repulsion theory and discuss the structure of NH_3 with reference of this theory.
2. Briefly explain shapes of NH_3 and H_2O molecule according to hybridizing theory.
3. Why bond formation is not possible between two He atoms? Prove with molecular orbital theory.

CHAPTER NO.7 THERMOCHEMISTRY.

SHORT QUESTIONS:

1. Burning of a candle is a spontaneous process Justify.
2. Is it true that a non –spontaneous process never happen in universe? Explain it
3. What are thermochemical reactions, give their type.
4. Describe system and surrounding.
5. What is Enthalpy of a reaction? How is delta H of a reaction measured in laboratory by glass calorimeter?
6. Define enthalpy of reaction. How is it measure by glass calorimeter
7. How Delta H can be determined by using bomb calorimeter.
8. State and explain with an example, the Hess's law of constant heat summation.
9. Difference between Standard enthalpy neutralization and Enthalpy combustion.
10. What is standard enthalpy of solution?
11. State first law of thermodynamics. Give its mathematical formula.

LONG QUESTIONS:

1. Describe bomb Calorimeter
2. Define and explain Hess's law of constant heat summation with examples.

CHAPTER NO. 8 CHEMICAL EQUILIBRIUM.

SHORT QUESITONS:

1. Difference between reversible and Irreversible reaction.
2. Calculate the pH of a buffer solution in which 0.11 molar CH_3COONa and 0.09 molar acetic acid solutions are present. K_a for CH_3COOH is 1.85×10^{-5} ?
3. Benzoic acid $C_6H5COOH$ is a weak mono-basic acid ($K_a = 6.4 \times 10^{-5}$ mol. dm^{-3}). What is the pH of a solution containing 7.32 g of sodium benzoate in one dm-3 of 0.02 mole dm^{-3} benzoic acid?
4. How does a catalyst affect a reversible reaction?
5. Define pKa and pKb
6. Define common ion effect with ne example.
7. What is acidic buffer? Give one example.
8. Give two application of buffer solution.
9. Define buffer solution. Why do we need them in daily life?
10. Explain the term Buffer Capacity.
11. Define Lowry Bronsted concept of acid and bases.

LONG QUESTIONS:

1. Calculate the pH of buffer solution in which 0.11 molar $H_3CCOONa$ and 0.09 molar acetic acid solution are present Ka for $H_3CCOONa$ is 1.85×10^{-5}
2. The solubility of PbF_2 at 25 °C is 0.64 g dm^3. Calculate K_{SP} of PbF_2
   Atomic Mass of Pb = 207.2 g mol^{-1}
   Atomic mass of F = 19 g mol^{-1}
3. Benzoic acid C_6H5COOH, is a weak mono basic acid (Ka = 6.4×10^{-5} mol dm-3). What is the pH of a solution containing 7.2 g of sodium benzoate (C_6H_5COONa) in one dm^3 of 0.02 mol dm^{-3} benzoic acid?
4. The solubility of CaF_2, in water at 25 °C is found to be 2.05×10^{-4} mole dm3. What is the value of K_{SP}

CHAPTER NO. 9 SOLUTION

SHORT QUESTIONS:

1. One molar solution of glucose in water in dilute as compared to one molar solution of glucose. Justify.
2. One molar solution of urea is more dilute as compared to its one molar solution why.
3. Why concentration in term of molality is independent of temperature which molarity depends upon temperature.
4. Write two statements of Raoul's law.
5. Difference between Ideal and non –Ideal
6. Give conjugate solution with one example.
7. Write any two application of boiling point elevation.
8. Describe ebullioscopy constant with an example.
9. Define cryoscopy constant with an example.

LONG QUESTIONS:

1. Define the following terms: Molality, Mole fraction and part per million.
2. What is Raoul's law? Give its three statements.
3. Describe one method to determine the boiling point of elevation of solutes.

CHAPTER NO. 10 ELECTROCHEMISTRY.

SHORT QUESTIONS:

1. Define electro chemistry.
2. Define oxidation state with two examples.
3. Calculate oxidation number of Mn in i) $KMnO_4$ ii) K_2MnO_4 III) Na_2MnO_4
4. Calculate oxidation number of chromium in the following compounds. i) $CrCl_2$ ii) K_2Cro_4

5. Define oxidation number and calculate the oxidation state of underlined element.
   a) H_3PO_7 b) $Ca(CrO_3)_2$
6. What is electrochemical series? Give its four application.
7. What is use of salt bridge?
8. A porous plate or a salt bridge is not required in lead storage cell.

LONG QUESTIONS:

1. State rules for assigning oxidation number of elements with examples.
2. Write construction and working of voltaic cell.
3. Describe the electrolysis of molten sodium chloride and a concentrated solution of sodium chloride.
4. Give four industrial importance of electrolysis process in detail.
5. What is electrochemical series? Give its four applications?

CHAPTER NO. 11 REACTION KINETICS

SHORT QUESTIONS:

1. Define rate of reaction.
2. What is specific rate constant of velocity constant.
3. What is meant by order of reaction? Give an example.
4. Define Half-life period. How it is used to determine the order of reaction?
5. The radioactive decay is always a fist order reaction.

LONG QUESTIONS:

1. How light and surface are affect the rate of reaction.
2. Write four characteristics of a catalyst.
3. How does Arrhenius equation help us to calculate the energy of activation of reaction?
4. Define Half-Life period and order of reaction. Describe half-life method to determine the order or reaction.